



## **So You Want To Be An Astronaut**

Alan Shepherd, John Glenn Jr., Sally Ride, and a hand-picked select few are names that conjure up images of bravery and adventure. As astronauts, they probably have some of the most recognizable names in our country.

As astronauts (derived from Greek words meaning "star sailor"), their collective voyages have just begun.

When the Space program began in 1959 there were only seven such people in the entire country. They all were--or had been--in the armed forces. That was only 36 years ago and since then, much has changed.

Today shuttle crews are comprised of Americans from every race, creed, color and gender. As of May 2, 1993, 180 Caucasian men and 21 women, six African-American men and one woman, three Hispanic men and one woman, and two Asian men had been chosen to represent our Nation in Space.

### **The Odds**

NASA chooses its astronauts from an increasingly diverse pool of applicants that, 'looks like America'. From thousands of applications from all over the world, approximately 100 men and women are chosen for an intensive astronaut candidate training program every two years. "I cannot imagine a better career. I've done more than I could ever have imagined. I'm thankful that I've been at the right place at the right time," said Kenneth S. Reightler.

The study time involved is no more lengthy than that of any other professional career requiring graduate/post-graduate study. If becoming an astronaut is a dream, held long and steadfast, than this labor will be one of love.

### **Early Preparation**

The preparation begins in elementary school. It is here that the foundations are laid down and then built upon," said Colonel Charlie Bolden, Deputy Commandant of Midshipmen at the US Naval Academy. "Start with the basics and get them down first...you can't do anything without math and science." Students should read everything they can get their hands on about astronauts, Space in general, and their field of interest in particular.

Other skills Bolden felt were integral to becoming an astronaut were: knowing how and being able to work as a team player; understanding and appreciating both your ethnic, cultural and American history; and maintaining a grasp on current events.

Bolden does not hold the opinion that American young people are less equipped than their foreign counterparts. "I listen to people say that American Students can't do this and can't do that. I don't buy into or accept that at all. Kids are just as sharp as when I came up. Its just motivation that may be lacking," Bolden said.

It is also interesting to note that out of 195 former and present astronauts, 123 have taken part in Scouting--or 64 percent. Because of the direct mission that scouting fulfills it would help to develop those skills.

## College

In high school, it is particularly important for the student to earn the best possible grades for standardized test scores (SAT and/or ACT). It is then time to make some decisions as to the specific direction of study, such as, engineering, biological or physical science, or mathematics.

What next after students graduate from high school? "If you do things thinking that, 'This will look good on a resume' or I'm not going to like it but it'll help me get selected someday,' you will do yourself a disservice. You're not going to do as well as you would at something in which you're interested," said Reightler.

The "minimum degree requirement" for an astronaut is a bachelor's from an accredited institution. Three years of related increasingly responsible professional experience must follow that degree.

Most astronauts to date, however, continued with career and/or education to the post-graduate levels and were able to substitute education for all or part of their work experience requirement. Admittedly though, being selected could be a couple years off at the very least. In the mean time you'll need to eat and pay the rent. Besides, more experience can only bode well for the applicant in the long-term.

NASA contributes funds to 51 colleges and universities through its Space Grant Consortia. By attending these institutions you are ensured that the curriculum for Space programs offered will conform with guidelines NASA finds acceptable. To receive a list of the consortia schools write to:  
NASA Education Division, Code FEO2, 300 E Street S.W., Washington, D.C. 20546.

Many schools offer degrees in technical fields, math, and science. Check with a guidance/college counselor or a good college directory.

Whatever school you do attend--one aspect remains the same--do the very best that you possibly can. You will need the grades to graduate into a good Master of Science program. Obviously you will need to center your curriculum around science and the technologies. There are many degree options.

To communicate--both written and verbally is also vital to working in the Space program. To know history is important to success--not only as an astronaut but as a citizen. Bolden (who had to wake up extra early to attend a class in basic Russian language to prepare for his mission with a cosmonaut in February) suggests that every American should be--at the very least--bilingual.

"Space is a multinational and multicultural-cultural operation. Working with Russian cosmonauts is very difficult if astronauts don't know anything about Russian culture and their history as a people", said Bolden.

## **Internships/Co-ops**

During university study, as soon as students arrive on campus they should go to the co-operative and recruitment offices to explore the possibilities of an internship or work/study position to gain vital experience necessary to be marketable. Students who did not explore career possibilities until their senior year could miss this opportunity.

"There isn't one particular type of work experience that NASA is looking for. NASA--like any other employer--wants to know how well a person has done. If you come from a research background, they'd look at published work in technical journals, lecturing or TA experience, and also any awards that you may have won," said Dr. Ellen Ochoa Mission Specialist, and the first Hispanic woman in Space. "Everyone should have summer jobs. You need some sort of experience."

This will also help you to understand what the particular companies are looking for in terms of hiring policies and experience levels. These students are often offered jobs either when their internship is completed or upon graduation.

## **Application**

Once the student is qualified on paper, it is now time to send in US Government Application Form 171 to the Johnson Space Center in Houston, Texas. There it will be reviewed and ranked according to height considerations (at least 58.5"), experience and expertise (i.e.: geologists, physicists, chemists, biologists etc.). Much like other application processes, aspiring astronauts compete with an average of 4,014 other applicants for an average of 20 slots that open up every two years.

These applications go through another round of ranking and rating by more stringent requirements in order to eliminate further applicants. From an average of 4,014 applicants, an average of 118 are asked to come to the JSC and undergo one week of interviews and medical examinations and orientation.

## **Selection Criteria**

Ochoa noted that the Astronaut Selection Board (ASB) is looking for people who have done very well in a technical field. A candidate should make sure that they have sterling recommendations-- especially from undergraduate and graduate school professors that can attest to your problem solving abilities, communicability with others and your ability to work well in a team.

The ASB interviews each person and assigns them a rating based on: experience and potential, motivation, ability to function as a member of a team, communicative abilities, and adaptability. Some applicants do not possess the required interpersonal skills and other requisite characteristics for the position and are rejected solely on that basis.

A significant number of applicants do not meet medical standards and still others withdraw after gaining complete understanding of the job. Based on information collected during this investigation, ASB will choose its final candidates and pass that recommendation on the NASA Administrator who will make the final pick. Once selected, candidates begin a rigorous training program.

## **Drawbacks**

As with any other career, being an astronaut has drawbacks. One commonly shared among astronauts, is the lack of time--for family and with the work load. "With this job you could work 24 hours a day, seven days a week and still not get everything done. You have to strike a balance--that is the key," said Reightler. "There can be long hours that are unpredictable. Travel is involved especially during the busiest times; three months before and two months after a launch," agreed Ochoa.

## **Salary**

If a student has hopes for a large salary comparable to those in the private sector--look elsewhere. Astronauts begin their salary in accordance with the US Government pay scale at GS-11 (approximately \$39,000.) status and top off at GS-14 (approximately \$78,000).

The work is sometimes long and arduous and it is not unusual for a candidate to arrive at work at 7:30 a.m. and not return home until after 11:00 p.m. "When you have a spouse and you don't see the Sun on them...that gets tired pretty fast," said Bolden. "But these are hurdles that you have to deal with in any relationship in any career," said Ochoa adding, "When you know its only for a certain time frame and it'll get better after a while, then its easier to handle. Its such a good job...you don't mind putting in the extra time. My husband and I work it out...but that's a problem working couples face everywhere."

Most people would consider being a astronaut a high-risk occupation and with many astronauts going home to a spouse, children, or both, it would be reasonable to think that the fear and anxiety of those risks would constantly be on their minds. "Not so," said the three astronauts. "We train for all different kinds of scenarios--most of which aren't very good. When you have a pretty good idea of what you should be doing in an emergency, it tends to reduce those emotions," said Ochoa.

If the pilot/commander position is the goal then the applicant must also be prepared to log in at least 1,000 hours of flight time in command of a jet aircraft prior to consideration. Most of the current and former pilot/commander positions have been filled historically by men who have served or are currently active in the United States Armed Forces. There are only a few exceptions. During training all crew members train aboard a T-38 jet. The controls are identical to that of the Space Shuttle and therefore, the jet can be used as a flight simulator either on the ground or in actual flight.

Keep in mind that these are the bare minimum requirements. "The one thing [astronauts at NASA] have in common is the way that they got here--not by all taking the same path but by seeking out the things that they found interesting and doing them with great gusto-- that's what works!" Reightler said.

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